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In Search of a Lead-Zinc Formula

WHEN delegates assemble in New York at the end of the month for another United Nations conference on lead and zinc they will find that in Washington a determined effort is being made to safeguard the American lead-zinc mining industry at the expense of its foreign competitors. It is a bizarre situation, and let us hope that the news agencies avoid getting their conferences crossed.

Since the Americans will come in for heavy criticism they ought, at the outset, to be relieved of a charge of simple rudeness. It is true that in some respects the timing is a little unfortunate but it is the dictates of the Congress timetable rather than a desire to cock a snook at United Nations commodity schemes that has forced the protectionists to introduce their Bill at this time; left till later it might not be completed before Congress rises. On the other hand, it will afford United Nations delegates a first hand opportunity of assessing the forces against international commodity schemes in the United States; so the coincidence has some positive advantage.

The Bill now before Congress has been introduced by the powerful chairman of the Senate Interior Committee, Senator James Murray of Montana. (Such sponsorship should thus ensure that it gets adequate time for a hearing.) It would give even greater protection than did the restrictions on imports to 80 per cent of the 1953-57 average imposed by President Eisenhower last October. There are mixed views about the efficacy of these import restrictions. Certainly, the mining industry regards them as inadequate, though the Secretary of the Interior, Mr. Fred Seaton, is reported to have told congressmen from the mining states, that he believed that they "had substantially improved the domestic lead and zinc situation".

What is undeniable is that the present level of lead-zinc prices is not high enough to reopen some American properties or to prevent the imminent closure of an unknown number of others. Mr. Howard Young, president American Zinc Lead and Smelting, has said he needs a zinc price of 11.50 c. to reopen his Wisconsin mines and one of 12.50 c. to reopen his Oklahoma mines. Senator Moss has said that in the past 10 years Utah's underground mine labour force has fallen from 3,200 to 1,400. Utah has lost two of its three smelters and he believes may lose its third. But, of course, some drop in the labour force must be attributed to higher productivity and perhaps more to the development of opencast properties. Yet the fact remains that Mr. Robert Koenig of Cerro de Pasco—to quote only one big foreign producer—has said that all along his lead and zinc properties have made profits.

What has riled the Americans is that in the past year there has been a handsome growth in imports of lead and zinc in processed forms; though they must have been very naïve not to have foreseen this. To the extent that this movement has been prompted by import restrictions on ores, the American have not only failed to preserve business for their own mines, they have managed to lose it for their own smelters. There has, in consequence, been an actively canvassed suggestion that the range of the restrictions

should be extended to cover processed metals. Happily, this seems for the time being to have been dropped. It can only distort the pattern of trade still further and is inherently incapable of succeeding in its purpose.

What makes the whole business so tragic is that the Free World is investing in unwanted smelting capacity to circumvent American import restrictions when it may lose the war against Communism simply for lack of capital; and what makes the business farcical is that some of this investment in surplus capacity is being carried through with American aid. Meanwhile, Cerro de Pasco has bought its way very heavily indeed into the American fabricating business in the past year or so as a hedge—not, however, against the vagaries of trade, but against the policies of the protectionist lobby in Washington. There is, indeed, a grave danger that the search for metals abroad (and not only for lead and zinc) may become less vigorous—even though the long-term supply is by no means assured.

The reply to all this, as set out in Senator Murray's Bill, is to stabilize the price of lead at 15.50 c. per lb. and of zinc at 13.50 c. per lb. for a given base quarter. Thereafter, the prices would fluctuate quarterly with the average price index, and imports would be adjusted by quotas to uphold these predetermined prices. Where President Eisenhower's restrictions cut imports by 20 per cent, this Bill (though it is difficult to make the calculation) is said to cut them by 50 per cent; which could only lead to the growth of imports of ever more highly processed metal. It is pointless at this stage to assess its chances of success. It is sufficient to take it as evidence that the American miners insist on having some further protection—whether in this form or not—and that unless a marked upturn in demand improves the price level, the chances are that they will get it.

How will all this affect the United Nations conference in New York? Obviously, it will put a damper on it. But it ought to be possible for the conference to bring a bit of common sense to the world's lead-zinc mining industry. To a certain extent American protectionism is simply an attempt to deal with a world problem of temporary surplus in strictly national terms. Well, all countries are trying to do the same. But there is a sense in which this is a peculiarly American problem and America ought to be asked to see it as such.

The fact is that American lead-zinc mining is in decline. This is a painful situation but it has to be faced and it is in no way unique, as—for example—the Lancashire cotton industry will confirm. There is a lot to be said, when an industry is in inevitable decline, for not allowing it to decline too fast. There is nothing to be said for trying to stop it declining at all. If cost figures were put frankly on the United Nations conference table it might be possible to convince the Americans of the hopelessness of their efforts and to persuade them that their best interests lay in regrouping the industry to produce profitably at a lower level of output.

On the other hand, the enthusiasts for commodity schemes must moderate their ambitions. There is no chance of an immediate commodity scheme coming out of the New York meeting; and on the present inadequate production and distribution statistics, it would be folly to attempt one. Yet two arguments against any sort of scheme ought to be refuted.

One is that American anti-trust law would prevent the American industry from joining in. This is rubbish. United Nations schemes specifically preclude individual producers and admit only governments; and if the American Government can join the International Wheat and Sugar Agreements (of both of which it is an enthusiastic member) and take a benevolent interest in the Tin Agreement, it could certainly join a Lead-Zinc Agreement if it wanted to.

Secondly, it will be urged that the Tin Agreement has failed, *ergo*. . . . But though the Tin Agreement has not worked as was expected by its authors, it has almost certainly made the decline and recovery of tin much less violent than it would have been without it. Here is the clue to what United Nations policy ought to be in New York. It ought to be moderate. It ought to try to prevent the problem being seen in black and white terms. The choice does not lie between free trade and controlled schemes. There are already restrictions on American imports which by any standard are morally and economically unjustifiable. Free trade in its classical form does not exist any more.

On the other hand, to favour some sort of international agreement does not necessarily imply a closely-knit scheme such as exists for tin. It should be possible to reach agreement on a plan which (apart from providing for very much improved statistics, to which presumably nobody could object) had only a negative policy for the time being; and which aimed simply to list certain national solutions to the present lead-zinc surplus as unacceptable because they were internationally harmful.

For the time being the United Nations should be content with getting the producers and consumers of the world to discuss their common problems and to get some reasonable give and take in international lead-zinc trade. It would be rash to try to do much more; the news from Washington shows how dangerous it is to be content with anything less.

MINERALS IN CHILE

Outside of the American copper companies operating in Chile, smelter output is also on the increase. In 1958, 19,940 tons of blister copper were produced at the Paipote smelter for electrolytic refining by the Norddeutsche Affinerei in Hamburg, and the target for 1959 is 23,000 tons.

In addition, the Empresa Nacional de Fundiciones has confirmed the $U.S.5,500,000 contract with the German Kloeckner group for the supply and installation of machinery for the copper smelter at Las Ventanas, 20 km. north of Valparaiso. The smelter will have an annual production capacity of 30,000 tons of copper, and the plant will begin operation in mid-1961.

The position with regard to coal is currently not encouraging. The difficulty lies in the inability of the companies to find markets for their production. The Lirquen Coal Company closed its mine in January for this reason, and was forced to dismiss some 1,400 workers. The workers requested the government to order the company to maintain its operations, but the company replied that in such circumstances it would declare itself bankrupt.

The government has now decided to appoint a commission to report on the problems of the coal-mining industry and to make recommendations for its future development. At the same time, the Schwager coalfield is also affected. Part-time working began there on February 7, because of the accumulation of stocks and reduction in sales.

The production of iron ore in 1958 is provisionally estimated to have been 4,000,000 tons, as compared with 3,100,000 tons in 1957. Exports from Chanaral and Caldera in Chile have recently increased by 100,000 tons per month as a result of increased mechanization of the handling and loading installations at the two ports.

With regard to other minerals, the Corporacion de Fomento has been granted three concessions of 18,750, 5,000, and 2,500 hectares respectively in the Department of Iquique for the exploitation of calcium carbonate deposits. The mineral production is to be 2,000 tons per month from each concession, and is to be used by the soda ash plant which Corporacion de Fomento is to erect in Iquique.

Due to the effect of increased electricity charges on its production costs, the ferro-manganese plant at Guayacan owned by the Compania Manganesos de Atacama has been closed. The Compania de Manganesos de Chile, on the other hand, having learned that manganese probably exists in the Corral region of Valdivia province, is reported to be considering the acquisition and operation of the Corral ironworks owned by the Compania de Acero del Pacifico.

SOME RECENT DEVELOPMENTS IN SOUTH AFRICAN MINING PRACTICE

In recent underground deep-level mining operations, conducted at 8,000 to 9,500 ft. depth on East Rand Proprietary Mines in the Central Rand, it has been found that longwall stoping has reduced rockbursts appreciably. Last year, however, further steps were taken in the achievement of preventive measures when the aid of the South African Council for Scientific and Industrial Research was enlisted, and when the concept of de-stressing stope faces was developed. This concept has been described by our correspondent in Johannesburg.

This practice of de-stressing involves the drilling of long holes directly into the face. The face is then blasted to increase the extent of the fracture zone and to push the areas of high stress—the area responsible for bursts—away from the actual working face. The result of the application of this method has been that incidence of bursts has decreased by 33 per cent over the last four years, and that "severe" bursts have decreased by 77 per cent. Indeed, few pressure bursts now occur during the day shift, when mass-danger to personnel may be anticipated.

Cooling plants are a major feature of the East Rand Proprietary ventilation system. Underground cooling plants and spray chambers are constructed, and the surface and underground systems will eventually have a combined capacity of 4,300 tons of ice daily. In August last year, mining operations commenced at 11,000 ft. below surface.

Interesting developments in milling may be seen at Winkelhaak where the mill started up in the middle of last year. Basically, this mill consists of four large 50-ton capacity tube mills with cyclone classifiers in closed circuit, while provision is made for a jaw crusher ahead should this be necessary. For the first time on any mine, an electronic pebble feed is being used instead of the empirical manual feed. The electronic feed operates on the principle that maximum power consumption is approximately in direct relationship to maximum efficiency.

SEEKING COAL RESERVES IN EIRE

Test drilling for coal reserves will begin shortly at a site at Wolfhill, Eire. A contract for the boring has been placed with the Boyles Bros. Drilling Co. Ltd. The drilling will be part of the three-year survey of the Leinster and Connaught coalfields by which it is hoped to confirm the existence of valuable new coal deposits.

The exploration work is expected to cost about £85,000 and it is being carried out under a U.S. technical assistance grant. The work, in the main, will be directed by Irish engineers and drilling will be undertaken to depths of up to 1,000 ft. When tests have been completed in the Wolfhill area, exploration will begin in the Rossmore area.

I.C.I. IN 1958

The activities of Imperial Chemical Industries Ltd. during the last year are described in *Review for 1958*, a well-produced and beautifully-illustrated booklet of 32 pages, which accompanies the directors' report and accounts for the year. Among developments emphasized are those in accident prevention and materials handling.

The inaugural year of the new Heavy Organic Chemicals Division has been a successful one, with the volume of products sold increasing by 13 per cent. Similar expansion can be found in sales of I.C.I. rock salt. Indeed, some 500 local authorities purchased the company's rock salt in 1958, more than twenty-five times as many as five years ago. In expectation of continued demand the mine is being extended.

The experience of the Nobel Division in 1958 illustrates the effect on the company of events in other branches of industry. Manufacture of explosives is the main business of this Division, and in the U.K. the main outlet for these is in coal mining. Last year's reduction in output of deep-mined coal had an adverse effect on sales of explosives and accessories. By contrast, opencast production was increased and there was a record demand for the special types of explosives used for this purpose. It is satisfying for the company to record that some improvement in the production of lump coal by means of ordinary explosives has resulted from I.C.I.'s collaboration with the N.C.B.

Other activities show that the mild blasting action of the improved Hydrox steel-tube blasting has proved very effective. A shot-firing technique involving the firing of explosive charges under water pressure and pioneered by the Division, has increasingly been used by the National Coal Board, while a novel type of coal mining explosive underwent extensive field trials throughout 1958. This explosive proved to be efficient.

In the United Kingdom generally, production and use of non-ferrous metals was well below the industry's capacity during 1958. I.C.I.'s Metals Division underwent a considerable reorganization during the year.

Extraction, melting and fabrication of titanium continues to be an important part of the company's operations. During last year new furnaces designed to melt 2-ton ingots, under high vacuum conditions, were installed at Witton. In addition, the active campaign to establish titanium in the construction of chemical plant is now beginning to show results.

Titanium is only one of the new metals in which the Division is interested. Other developments have resulted from the unusual requirements of the atomic energy industry. Wrought zirconium products were placed on the selling range in 1957, and during the past year appreciable quantities have been processed for support brackets for fuel elements and for other accessories in gas-cooled nuclear reactors. Research work is in progress to determine the best methods of producing wrought forms of hafnium, a metal which may have important uses for control purposes in nuclear reactors. Niobium is another new metal that is the subject of research. This may be important not only in certain types of reactor, but may provide a base for a valuable alloy suitable for service at very high temperatures.

Recently, the Metals Division has been awarded a contract by the United Kingdom Atomic Energy Authority for the design, construction, and operation of a pilot-scale plant for the production of wrought beryllium components. These are required for fuel cans and other reactor accessories in the Authority's project for a gas-cooled nuclear reactor of advanced design. The pilot-scale beryllium plant will commence production in 1959.

Poland's Coal Mining Industry in 1958

THE year 1958 was characterized by developments in Polish coal mining, successful results being achieved both in increasing output and more efficient techniques.

The plan for production of hard coal was attained, with a surplus of 1,500,000 tonnes, giving a total output of 95,000,000 tonnes. This is an overall increase of 1,000,000 tonnes over the 1957 output. If, however, it is taken into account that the working year in 1958 was ten working days shorter than in 1957, then the actual increase in output per working day during the year was over 13,000 tonnes. This significant increase was attainable owing to constantly developing productive potential, technical advances and increased labour productivity.

The average daily length of working front with timbering (in walls, face sections, and roadways) increased from 87.3 km. in 1957 to 88.7 km. in 1958 and shows a tendency to further systematic increase which will ensure the planned growth in output for future years. During the year the average height of worked faces rose from 1.60 to 1.63 m. Thanks to this successful expansion of the working face, and in particular to the attainment of a significant increase in the daily advance of the face, i.e., faces by 3 cu. m., face sections by 14 cu. m. and roadways by 8 cu. m., a considerable improvement was achieved in intensity of exploitation. The average daily amount extracted from a single wall face was five tonnes greater than in 1957, and one tonne greater in roadways.

This more intensive exploitation resulted primarily from better and more expert use of machinery and installations, as well as from the introduction of modern techniques in coal getting, loading and transport. In 1958 some 20 per cent of coal was mechanically loaded, a total of about 20,000,000 tonnes. At the same time 32.7 per cent of the coal getting was mechanized and 95.61 per cent of the total output was mechanically conveyed.

Special attention is merited by the steps that have been taken to introduce new techniques into Polish coal mining. A number of collieries such as Siersza, Kosciuszko, Komuna Paryska, Czeladz, Debiensko, Andaluzja, are successfully introducing hydromechanization in either coal getting or transport and in some cases in both processes. During the year over 500,000 tonnes of coal were extracted, loaded and transported by hydraulic methods. It is, therefore, fair to say that hydromechanization, the newest form of technical advance in Polish coal mining, is beginning to play a significant role in the industry's rising production.

A major success has been the installation of fully efficient vertical hydraulic raising of coal over a depth of 300 m. at the Debiensko colliery. Appropriate development and application of this technique may in future play a decisive role in the establishment of a completely new type of mine. (See *The Mining Journal*, April 3, 1959, page 370.)

The motivating force behind the expansion in mechanized coal mining is provided by the twenty works that manufacture mining machinery in the country. These establishments are associated to form a "Union of Mining Machinery Works" which comes under the Ministry of Mining and Power. During 1958 they provided the industry with over 150,000 tonnes of machinery and installations of various kinds, to a total value of about 2,000,000,000 Zlotys.

A turning point in labour productivity was achieved in 1958. While in 1951-57 a fall in general productivity was observed (daily output per worker), in 1958 a 56 kg. increase in production per man/day was registered. During the first two months of 1959 this increase has been maintained, with a further rise of 30-40 kg. per day. A reduction in the amount of labour required underground (on transport and maintenance of the face) and at the surface was achieved during 1958. As a result of these achievements it became possible to reduce manpower in the coal industry by 11,300 workers in comparison with those employed in 1957. These results allowed for a reduction in unit costs by 1.52 Zlotys in comparison with the planned figure for 1958, with a total saving of 150,000,000 Zlotys.

Intensive investment also took place during the year, amounting to over 5,000,000,000 Zlotys for the coal industry and ancillary enterprises. This high investment programme was demanded by the 1956-60 Five-Year Plan, which is planned to ensure a hard coal output of 103,000,000 tonnes in 1960 and of 112,000,000 - 113,000,000 tonnes in 1965—i.e., an increase of 17,000,000 - 18,000,000 tonnes in a seven-year period.

Some of the fundamental aspects of the investment programme carried out in 1958 include:

The construction of 45 new levels in existing mines in order to expand their productive capacity in accordance with overall development plans. The capacity of these levels is estimated at about 120,000 tonnes per day.

The continuation of work on seven new collieries which were begun during the Six-Year Plan (1949-1955), i.e., Ziemowit, Wesola, Kosciuszko Nowa, Nowy Wirek, Halemba, Porebka, Mszana. These pits should yield in 1965 47,000 tonnes to 50,000 tonnes per day.

The continuation of work on four new collieries started between 1956 and 1958, i.e., Jastrzebie, Moszczenica, Szczyglowice and Staszic. Combined productive capacity will be around 25,000 tonnes per day.

The systematic speed-up of preparatory and coal-winning operations has made possible a considerable reduction in the times necessary for driving new levels and sinking new pits. These reductions are reported as 10-15 years down to 5-7 years in the case of opening new levels, and 12-13 years down to 8-10 years in the case of large new pits. This healthy situation in the coal industry in 1958 has created favourable conditions for the realization of the 1959 plan, which, on the indications of the January and February results, should be attained with the same measure of success as that for 1958.

Some 7,500,000 tonnes of brown coal were extracted in 1958, about 1,500,000 tonnes more than in 1957. During the year over 500,000,000 Zlotys were invested in the brown coal industry, an increase of 25 per cent over the preceding year.

The year 1958 was the first of a major development programme for brown coal (1959: 8,300,000 tonnes; 1960: 11,000,000; 1965: 27,000,000) which is directed towards making brown coal the fuel base for the development of electrical power generation. This programme envisages the establishment of two main mining/power centres, namely, Turow, with an output of 16,000,000 - 20,000,000 tonnes p.a. and Konin, with 9,800,000 - 18,000,000 tonnes.

By M.Eng. Tadeusz Muszkiet

Carrying Ore by Submarine

INTENSIVE research into the possibility of undersea freighting by submarine through a northern Canadian port in the vicinity of Hudson's Bay was carried on last year by Mitchell Engineering Ltd. Initial reports suggested that the success of the U.S. Navy submarines *Nautilus* and *Skate* in crossing the Arctic Ocean beneath the covering ice sheet indicated that a port in the Hudson's Bay area could, by use of submarines, become open to freight traffic for twelve months of the year.

United States sources in October last year (*Engineering and Mining Journal*, Vol. 159, No. 10) stated that shipping from Churchill is at present limited to a two and a half month season during the height of the summer. Yet, according to Mr. W. A. Richford, executive director of the Hudson's Bay Route Association, this area could accommodate the closest salt-water harbour to the Canadian prairie provinces and the northern United States plains area. Indeed, the chief outgoing cargoes from Churchill consist mainly of grain. Incoming ships bring miscellaneous imports and, of particular interest, last year 18,000 tons of nickel concentrate destined for Fort Saskatchewan, near the Rocky Mountain foothills.

The year closed with Saunders-Roe investigating the feasibility of nuclear-powered submarines by comparing the relative costs of submarine and surface vessels of various sizes, speeds, and payloads, and considering methods of general operation and docking for submarines. Insurance rates may well prove a decisive factor.

The result of these considerable researches has recently been made known in Britain by the announcement that a giant submarine named *Moby Dick* is ready for construction in this country. Designed primarily for ore transportation, the submarine will be the world's first nuclear-powered cargo vessel. At 50,000 tons, *Moby Dick* will be nearly ten times bigger than any submarine previously built. The illustration shows the envisaged storage facilities and conveyors. In operation, the vessel would travel 400 miles beneath the ice to some special port: Diana Bay, in the Hudson Strait, is now mentioned. Here the capacity cargo of 30,000 tons of iron ore from mining operations in the area would be loaded. Defeating the problem of transportation during the winter freeze-up, *Moby Dick* would pass 300 ft. below surface at 25 knots, and thus could cross the Atlantic immune not only from ice, but also free of adverse weather conditions. It is estimated that the vessel, 600 ft. long, would make a single crossing in three to four days.

The new submarine would carry a crew of fifty. The first operational type would cost less than £20,000,000, with this cost halved by the time three had been constructed. Atomic propulsion would give *Moby Dick* 75,000 h.p. for nearly two years without refuelling. Auxiliary engines would be installed for emergency duties. The submarine would not surface at all during the trip, but would rise only at each extremity harbour for the purpose of loading and unloading.

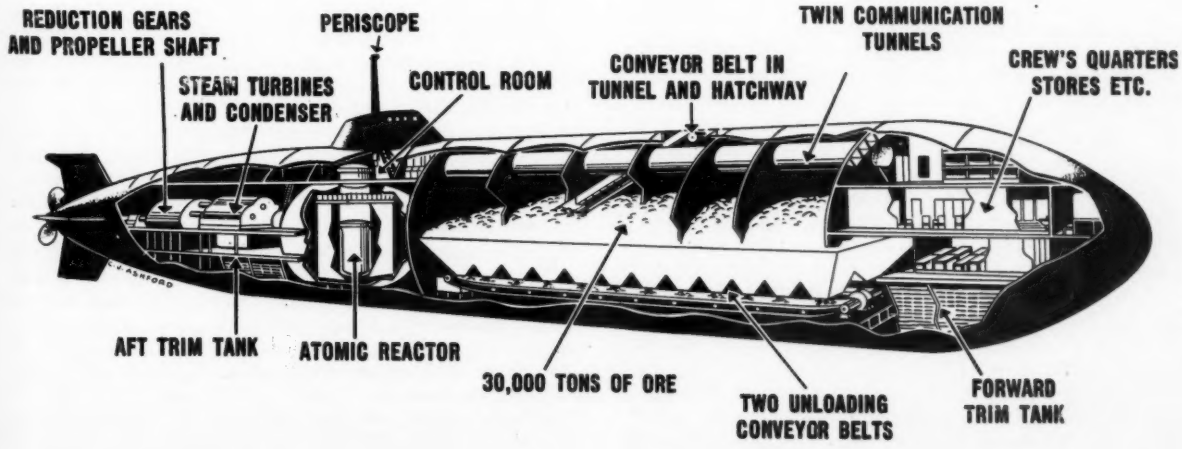
Currently, investigations are being carried on in Canada to establish whether an ice-free patch for surfacing can be kept open cheaply throughout the winter. The movements of icebergs through the pack icefields are also being studied. Long-range Asdic equipment would be used to avoid icebergs, and a submarine of the envisaged size could dive as deep as 600 ft. to avoid this hazard. However, some icebergs extend to a much greater depth than 600 ft.

It is also being determined whether *Moby Dick* could break through the ice sheet if ever the craft was called upon to surface in emergency. Tank tests on models carried out by Saunders-Roe indicate that if the hull—some 3 in. thick—could not smash through, the ice could be broken up by means of steam or compressed air.

Yet year-round transportation of the iron ores of the Hudson's Bay mainland are by no means the only possible application of submarines used as a medium of freight movement. Considerable deposits of oil exist within 200 miles of the North Pole, where oil interests have applied for prospecting rights over 76,000,000 acres.

The design of *Moby Dick* is reported from Canada as being regarded as equally applicable to oil freighting, as the Arctic oil deposits can only be drilled in the winter when the ground is frozen. In summer, huge areas become bogs. Further, the oil area consists of many small islands. Thus, submarines of the *Moby Dick* pattern are a possible answer to the transportation problem.

Canada's Northern Affairs Minister envisages the North transformed into one of the world's main commercial centres, as important to commerce as the Mediterranean is today. Indeed, the Arctic oil needs only to travel 3,000 miles to Europe, while supplies from the Middle East must be routed through 8,000 miles.

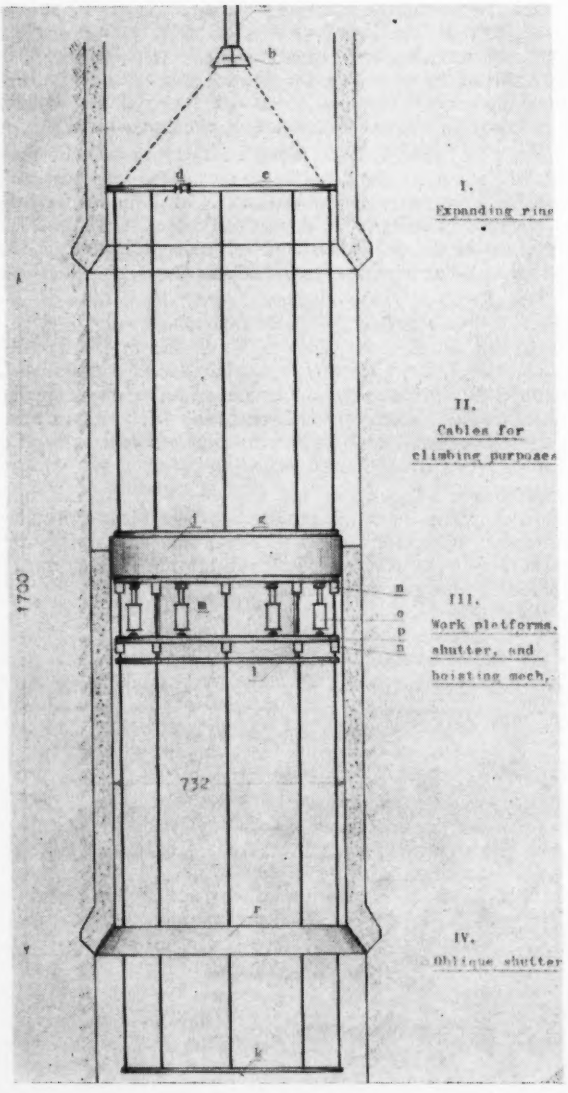


Concrete Lining in Shafts

BASED on experience in Holland and Germany, a new mechanical shaft lining plant is now being successfully used at the South Kirkby shaft sinking project. It has been developed by the Dutch firm, Laeven N.V., sub-contractors of the German shaft sinking company in charge of the new shaft.

The technique involves the use of a sliding shutter used in the construction of the concrete lining of the shaft's wall. This sliding shutter consists of four parts, namely: the expanding ring (steel construction), eight cables for climbing purposes, work platforms, shutter (steel construction), and hoisting mechanism (oil presses, catch wedges, and supporting ring), and the oblique shutter (steel construction).

The whole plant may be hoisted or let down in a shaft by means of a pulley block (b) suspended by a cable to a capstan, the latter installed on the ground. The platforms with the shutter can be moved upwards or downwards separately by the capstan, which will move alongside the cables for climbing purposes, while the expanding ring remains motionless, expanded in the shaft's lining. During the concreting operation, the platforms with shutter move upwards by means of the hoisting mechanism on the eight cables which are suspended on the expanding ring. The latter remains motionless, expanded in the shaft's lining.



Structure of the Platform

The expanding ring is a platform (c) which consists of two parts and has to bear a maximum load during wall concreting of 32,500 kg. Its two parts are pressed against the shaft's wall by means of two oil presses (d) of 30 tons each. To evoke greater friction between the outside surface of the expanding ring and the shaft's wall, the circumference of this ring is lined with a special material. The floor of the expanding ring is covered with 4 mm. steel plates. On this floor there are suitable apertures for elevator buckets and an escape cage.

The cables for climbing purposes have a diameter of 30 mm., are solidly closed, and have a safety factor of 17 : 5. Their upper ends are fastened on to the expanding ring, and the lower ends are connected by a common ring (k). The cables are about 30 m. long.

Of the work platforms, shutter, and hoisting mechanism, the upper platform (g) is meant to carry out the concrete lining; it is covered with 5 mm. steel plates and has apertures with valve clacks for buckets (h), an escape cage (i), and apertures for cables. The shutter (j) is placed just underneath the work platform, and consists of four equal parts which are expanded by means of four wedges. The whole is made of a steel construction and covered with steel plates of 5 mm. thickness.

Moving the Shutter

To make it possible to move this shutter in the finished completed parts of the shaft's wall, the wedges (j2) are removed from between the four parts of the shutter, and these four parts are drawn inwards. Thus the diameter of the shutter is reduced about 20 cm. The height of the shutter is 1 m. The lower platform (l) is meant to serve for handling the hoisting mechanism and the controlling of the newly finished shaft lining. This platform is constructed out of connected steel rings, covered with 4 mm. steel plates. It is suspended from the upper platform with a 3 m. distance in between, and has apertures for buckets, escape cage, and cables for climbing purposes. The aperture for all of it is walled with steel wire (m), from the upper platform right down to the lower platform, for reasons of safety.

The hoisting mechanism consists of eight upper and eight lower "catch wedges" (n), eight hydraulic presses (o), and a supporting ring (p). The catch wedges with the aid of wedges then fasten themselves on to the cables (II), and in this way they hold the platforms and the shutter in its place. The wedges are pressed against the cables through the bearings, which are connected to the body of the catch wedges, and the latter in turn are burdened by the weight of the platform and the shutter.

When the shutter is being moved upwards by means of the hydraulic presses (o), the bodies of the presses will press the supporting ring (p) and this will press on to the bodies of the catch wedges, which in consequence will press through the bearings on the wedges, and these wedges will fasten themselves on to the cables (II). Thus the lower catch wedges will support the whole loading of platform and shutter. The bodies of the upper catch wedges release the wedges from the grip on the cables and enable the catch wedges to move along the cables. After moving the shutter to the right height (30 to 50 cm.), the oil pressure from the presses is released, the whole weight lying on the bodies of the upper catch wedges which, through pressure on the wedges, will support the platforms and the shutter.

The ascent sequence of the supporting ring is as follows : The whole weight lies on the upper catch wedges. Through the opposite pressure of the oil in the presses the bodies of the presses will raise the supporting ring, and that will release the grip of the wedges on the cables in the lower catch wedges. To obtain free movement of the shutter along the sides of the cables (II) by means of a pulley block (b) suspended by a cable to a capstan, the wedges can be excluded from the operations by a special screw installation. The oil presses used to hoist the shutter are bilateral (stroke about 60 cm., oil pressure about 50 at.). The drive used for the presses is driven by means of an electrical oil pump placed on the lower platform. For construction of the foundations of sections of the lining a special oblique shutter of steel plates (4 mm.) is fastened by screws on to the sliding shutter.

Operation of the Sliding Shutter

The working scheme of the sliding shutter is very simple. The expanding ring is pressed against the shaft wall about 7 m. above the foundation of the last part of the concrete lining. The shutter is on the level of the fundament's excavation of the section of the shaft destined for concreting. The oblique shutter is installed, and the fundament is concreted on the full height of the oblique shutter. The shaft wall is concreted, by moving up the platforms and the shutter by means of the hoisting mechanism.

The diameter of the shutter is reduced. The expanding ring is suspended by a cable to the pulley block. Then the pressure of the expanding ring against the wall is released, and the whole sliding shutter is let down above the base of the section of the shaft recently concreted. The expanding ring is pressed again against the shaft wall in its new position.

The work platforms, with the shutter, are attached to the pulley block, which latter normally is pinned to the expanding ring. The wedges in the " catch wedges " are excluded from functioning, and then the platforms with the shutter are let down to the level of the new base of the excavation, the next section of the shaft to be side-lined. Then the wedges of the " catch wedges " are restored to operation, and the platforms with the shutter supported again by the " catch wedges ". Then the diameter of the shutter is enlarged to the normal size. The expanding ring is pinned again to the pulley block. The oblique shutter is installed, and then the base is concreted to the full height of the oblique shutter.

The concrete is passed down the shaft by a modern pneumatic concrete placing plant. Moderate power demand is one of the characteristics of this plant, which conveys up to 600 cu. ft. of concrete per hour through a pipeline to the discharge point. This modern method of placing concrete by compressed air has largely replaced mechanical transport methods, especially in shaft sinking.

Any normal length and depth of height can be supplied by simply extending or reducing the length of the pipeline. At South Kirkby shaft sinking project this plant proved to be the ideal method for sliding shutter installation. Thus, in spite of many difficulties, the concreting of the shaft wall could be carried out with the satisfactory average performance of 3 m. per shift and without interference with the excavating operations.

It can be said that the new method for the construction of the concrete lining in a shaft by means of the sliding shutter has proved a complete success. It is simple, rapid, economical and does not interfere with excavating operations, thus providing a technically sound solution to one of the most burning problems of shaft sinking.

Sealing Water-bearing Fissures

A NEW method of sealing underground water-bearing fissures and formations using a polymeric water gel has proved successful in a mined cavern for butane storage and in vertical mine shafts. These initial uses by the mining industry point to widespread applications.

The gel, marketed by Halliburton Oil Well Cementing Co. under the name, Hydro-Lok " PWG ", works by penetrating the capillaries of a water-bearing formation. Its initial viscosity is almost as low as that of water, which aids its entry into a formation.

Sun Oil Co., United States, while excavating the butane storage cavern in granite at its Marcus Hook refinery, encountered a small amount of water from two fault zones and seepage from many small fissures.

The problem was referred to the Dallas, Texas, research laboratory of the Sun Oil Co. Research suggested that the Halliburton water control materials—one of which is the polymeric water gel—might be the answer.

Operational System

The gel and a special resin cement were used for the treatments—the cement was employed as a bulking agent when spaces were large enough to require filling prior to sealing. The two materials were mixed in batches within the cavern, 306 ft. below the surface. Holes 6 ft. to 32 ft. deep were drilled to intersect the water-bearing fissures; packers were then set in the holes, and the water control agents were squeezed in and held under pressure. Injection pressures ranged from 400 to 1,200 lb. p.s.i. Setting time of the gel was adjusted to vary from eight minutes to one hour.

After 33 working days, more than 95 per cent of the water seepage had been stopped. This reduced the intrusion to a measured rate of less than 0.5 gals. per min. Some 600 treatments were made, varying from 3 gals. to 800 gals. each. A total of 7,946 gals. of gel and 736 gals. of resin cement were consumed.

The gel's success at the butane storage cavern was preceded by a shaft sealing job. Two large shafts in Morton Salt Co.'s Fairport Harbour mine at Painesville, Ohio, were sunk through a sandstone formation producing gas at 700 lb. p.s.i. pressure. Several gel treatments corrected this condition.

Machinery and Equipment

New Treatment Process

Arrangements have been made recently whereby Head Wrightson and Co. Ltd. become licensees for the Stripa process in the United Kingdom and the Commonwealth (excluding Canada). The exploitation of the process will be in the hands of their subsidiary, Head Wrightson Colliery Engineering Ltd., who will use it in conjunction with the Stamicarbon (D.S.M.) processes which have already been incorporated in many successful plants.

It will be recalled that the process was first noted in *The Mining Journal* when, in our issue of June 3, 1955, our correspondent at the Goslar Conference included "The Stripa process for sink-and-float separation", by J. Svensson, in his list of the papers presented. The process was described in *The Mining Journal Annual Review* published in May, 1956.

The process, for coal and mineral treatment, was developed at the Stripa mine in Sweden, controlled by Staellberge Grufveaktiebolag, where high-grade iron ore concentrates are produced. The process, which took its name from the mine, was developed to meet the pressing need of the iron ore industry for a cheap and simple process for the upgrading of iron ores. It has since been shown that the process can be used for the cleaning of coal. The initial local success of the process at the Stripa mine encouraged other mines in central Sweden to adopt it, and seven plants have been installed in recent years in the iron ore district of central Sweden.

Above is a view from the tail-end of the bunker when empty. Below is a close-up of the plough in operation

In the process, a convenient separating medium (a suspension of magnetite or shale, for example) is fed to a shallow, reciprocating trough, and the mineral to be treated is added a short distance from the medium feed point. The medium is concentrated to some extent in the trough, and conditions are set up permitting quick and accurate separation of a floating fraction and a sinking fraction, which are discharged separately at the end of the trough, the cut between them being made by an adjustable splitter plate. The medium solids used can be relatively coarse, and medium recovery systems are, therefore, very simple.

The licence arrangements now reported are the result of a close examination of the process by specialists from Head Wrightson and Co. Ltd. and Stamicarbon, and further development of the process, both for minerals and coal, is being undertaken by Head Wrightson Colliery Engineering Ltd. and the Dutch State Mines jointly. It would appear that the process will be especially useful for separating coal accurately at high densities, and that the separators will have a high capacity. It is also clear that economical plants can be designed embodying both Stripa and Cyclone washing units and suitable for both ore and coal treatment.

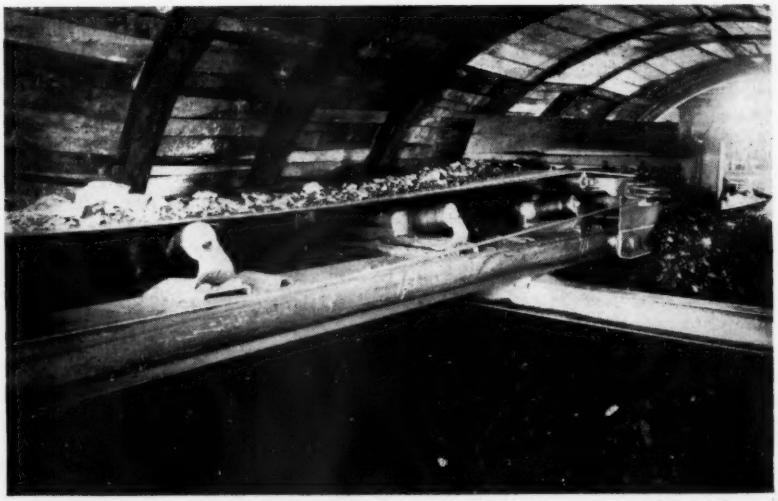
The success of the process in Sweden attracted considerable attention, and it soon became necessary to make special arrangements for its exploitation. This is now in the hands of Staellberg-Stripa Ltd., of Toronto. This company handles all licence agreements and is also responsible for the co-ordination of the activities of the various contractor licensees who design and supply complete Stripa plants. Applications in the Scandinavian countries are being dealt with by the staff of Stripa mine in co-operation with Swedish engineering sub-contractors, and licensees have been appointed in Canada, the United States, and the continent of Europe.

A BUNKER CONVEYOR

The bunker conveyor has been designed to receive large volumes of material at a varying rate, store it and subsequently discharge it to a further transport system at a uniform rate. The idea originated in the N.W. Division of the N.C.B., and the installation at Gibfield Colliery was supplied by Richard Sutcliffe Ltd.

The bunker conveyor consists of a series of 8 ft. long bays with steel plate sides 4 ft. deep and 6 ft. apart under which a steel plate conveyor forms a moving floor. Over one side is carried a feeder belt conveyor from which the coal is ploughed into the bunker and at the other side a walkway is provided from which an attendant can operate the plough-moving mechanism. The overlapping plates of the moving floor are carried on very heavy links which are in turn supported on stationary rollers fixed along both sides of the bunker bays. Tensioning of the chains is done by moving the tail end sprockets by hydraulic jacks but when sufficient tension is achieved they are held positively by heavy screws. When discharging, the moving floor has a very low speed, for example, at 240 tons per hour the speed for the size of bunker quoted is only 7.5 ft. per min. This slow speed together with the heavy masses involved rules out rotary transmission and so hydraulic jacks with ratchet type horns engage with the chains to provide the propulsion.

The propulsion unit is fitted near the delivery end of the conveyor and takes the form of a mild steel carriage running



on cast iron ball-bearing rollers. The two driving horns are fitted to this carriage and fall by gravity to engage with the bottom strand of the chain. The carriage is propelled by twin hydraulic jacks of 18 in. stroke. The horns are fitted with a ratchet so that on the return stroke they lift clear of the chain. An automatic reversing gear keeps the carriage moving to and fro whilst the control lever is in the "on" position.

The plough used to transfer coal from the feeder conveyor into the bunker is mounted on a carriage. The latter runs on the feeder conveyor stringers and is hauled backwards and forwards along the bunker by a rope winch. A reversible hydraulic motor drives the winch, and pull wires are provided along the full length of the bunker to allow the operator on the walkway to control the position and direction of movement of the plough carriage.

The movement of the plough enables the bunker conveyor to function in three distinct ways. First, with the plough at the discharge end of the bunker, the latter, whether full or not, can be bypassed. Second, with plough near discharge end and the bunker conveyor moving, the correct depth of material can be maintained in the bunker to give the required discharge rate by moving the plough backwards to take care of an excess supply and forwards for a deficiency. Third, when an interruption of the discharge system occurs the bunker conveyor is stopped and then completely filled by moving the plough backwards, maintaining the correct depth of material until the tail end of the bunker conveyor is reached.

Bunker conveyors of capacities up to 300 tons are in course of design.

AUTOMATIC PIPE THREADING

The Spiro Ball Bearing Co. Ltd. recently introduced a fully automatic pipe threading machine. It is simple to operate and is either of the portable or stand type. The machines are powered by electric motor or petrol engine drive, and in the case of the portable machines both electric motor and petrol engines can be fitted on the chassis.

In the method of operation, the pipe to be screwed is placed on the work mandrel, which grips the pipe internally. The machine is started, and the correct depth of thread is set on the calibrated quadrant on the machine. The pipe to be screwed then moves automatically throughout the cycle of operations, completes one revolution, and the thread is formed perfectly. An automatic cut-out stops the machine at the end of the operation. Threads are formed with an abrupt end to prevent damage in later handling, and this form of thread is found to be quicker for assembly purposes, due to the threads remaining undamaged.

ALUMINIUM-FACED ASBESTOS CLOTH

Turner Brothers Asbestos Co. Ltd. have announced an addition to their range of woven asbestos cloths, among which several qualities are now available having a coating of bright and highly reflective aluminium. In addition to thermal insulation duties, these special fabrics are also being adopted for fire-fighting and other protective clothing applications.

MINING MISCELLANY

Copper ore deposits to the north-west of Kautokeino have been discovered in Norway. These, it is stated, could be profitably mined and investigations are to be started. The Borregaard concern is reported to be taking over Foldal Verk, the important producers of sulphur pyrites and metals.

★

Dr. T. Ipponmatsu, vice-president of the Japan Atomic Power Co., has been handed by Lord Plowden, chairman of the United Kingdom Atomic Energy Authority, a Letter of Intent to supply fuel for the nuclear power station to be built in Japan for the company by the General Electric Co., Simon Carves Group. A technical assistance agreement between the Japan Atomic Power Co. and the United Kingdom Atomic Energy Authority was signed at the same time.

★

A new mine is being opened up near Pristina, southern Serbia, to exploit rich ore reserves reported to contain gold, silver, pyrites, and bismuth. At Mojkovac, in Montenegro, a lead-zinc mine is under construction. Here, ore reserves are estimated at more than 3,000,000 tons.

★

The scheme authorized in 1954 for the reorganization and development of the Hafodyrynys, Tirpentwys, and Glyntillery collieries in the No. 6 (Monmouthshire) area of the South-western Division of the National Coal Board is now well advanced. The project is one of the various measures taken to maintain and improve the overall output of the area and to counteract the approaching exhaustion of some of the smaller collieries.

★

The world's largest iron ore deposits have been discovered in the Krivoi Rog area of the southern Ukraine, according to the Russian news agency, Tass. Exploitation of the deposits is to start in 1961, when 7,400,000 tonnes will be produced in the one area annually. This amount represents more than half the annual output of iron ore in Sweden or Canada.

★

The Government of Portugal has decided to accredit a delegation to the High Authority of the European Coal and Steel Community. It will be headed by José Chalvet de Magalhaes, permanent representative of Portugal to the Organization for European Economic Co-operation.

★

During January and February this year, a survey of Uruguay's manganese and iron ore deposits was carried out by two German geologists lent by the Bonn Government. Preliminary results have so far only served to confirm the existence of the ferro-manganese deposits discovered by British geologists in 1936, which were not then considered to have sufficient yield to make their exploitation worth while. Sample ore has been sent to Germany for analysis, and on the results Uruguay will decide whether or not to incur the heavy expense of carrying out further surveys at deeper levels.

★

Three standards were published by the British Standards Institution on April 9, 1959, namely: BS 1547:1959, flameproof industrial clothing; BS 3119:1959, method of test for flameproof materials; and BS 3120:1959, performance requirements of materials for flameproof clothing. A completely new family of railway rails comes into being with the issue of revised editions of BS 11 and BS 47.

★

Public tenders, closing on September 30 next, have been called in Argentina for the exploitation of iron ore deposits of the Sierra Grande region of Rio Negro province. These reserves, which are estimated at 200,000,000 tons, are easily accessible and should be economical to work. Their mineral content is estimated at 55 per cent iron with a phosphorous content of just over 1 per cent.

★

The Exchange Department of the Bank of Brazil announces that imports from Germany of zinc and lead, processed there from Danish ore mined in Greenland, may be paid for in Danish crowns at international prices. Ingots must be stamped "Melted from Greenlandian ore", and shipping documents, issued in Germany, must be visa-ed in Copenhagen by the Danish Chamber of Commerce and the Brazilian Consul.

★

The Consejo Superior de Mineria, Spain, have published statistics relating to mineral production in 1957. Production in millions of pesetas: anthracite, 1,139.7; soft coal, 4,719.4; lignite, 1,013.1; bauxite, 2.9; zinc, 266.7; copper, 19.5; copper pyrites, 104.4; copper (rocks), 35.7; tin, 57.3; iron, 1,210.8; iron pyrites, 628.1; lead, 550.5; rock salt, 24.8; wolfram, 90.0.

★

The Department of Mineral Production, Brazil, reports that preliminary investigations show that the reserves of the recently discovered bauxite deposit of Retiro Branco, in the Pocos de Caldas region of Minas Gerais, are much more important than was previously estimated. The mineralized zone extends over several square kilometres in wooded country, and the bauxite, which is of excellent metallurgical quality, exists in large slabs, or layers, up to 15 m. thick.

★

Geologists have discovered "whole mountains" of nepheline, an aluminium-bearing ore, in the Alatau mountains of Central Siberia. A new mining town called Goryachegorsk is now being built in this region which will be linked with the trans-Siberian railway.

★

The Cyprus Mines Corporation of Los Angeles and the Albatros Sulphuric Works of Utrecht are to build jointly a new sulphuric acid plant at Pernis, near Rotterdam. The plant is likely to become the most up to date, perhaps the largest, of its kind on the European Con-

tinent. It will have a capacity of 120,000 tons of concentrated sulphuric acid. The present four existing plants of the Albatros concern have a combined capacity of 150,000 tons.

★

A new record has been set up by A/S Sydvaranger, the company which operates Norway's biggest iron ore mines. The output of iron ore concentrates reached nearly 1,200,000 tons last year. Sales totalled 1,100,000 tons, worth nearly 95,000,000 krone, about the same as last year. The United Kingdom took 273,000 tons.

★

Companhia Vale do Rio Doce, Brazil, has inaugurated a modern installation for mechanically loading fine ores at the port of Victoria, capacity 1,200 tons per hour; also a system of aerial cables to convey ore from the Conceicao and Dois Corregos mines to the railhead 4.7 miles distant.

★

Dr. J. A. Stratton, president of the Massachusetts Institute of Technology, has announced that the Institute has received from Mr. and Mrs. C. H. Green, of Dallas, Texas, a gift of $2,527,500. This represents its April 1 market value of 30,000 shares of stock of Texas Instruments Inc., in which form the gift was made. The money will be used for the creation of a Centre for Earth Sciences, a major building on the M.I.T. campus to house vitally important laboratories for work in geophysics, meteorology, oceanography, and related fields. Mr. Green, an M.I.T. alumnus of the class of 1923, is a vice-president of Texas Instruments and chairman of Geophysical Service Inc.

★

Exploitation of large tin deposits has started at Solnechni, near Komsomolsk-on-Amur. A new mining town is being built near this deposit, the first in the Soviet Pacific area.

★

Brazil's National Institute of Economy has published a comparison of the balance sheets of fifty-six mining companies, operating in Brazil, in 1956 and 1957. Their combined fixed assets increased from 6,023,000,000 cruzeiros in 1956 to 8,563,000,000 in 1957; paid-up capital from 3,627,000,000 to 4,250,000,000; the total investment from 8,770,000,000 to 13,722,000,000; average percentage of profits on paid-up capital from 14.6 to 37.7 per cent; average percentage of profits re-invested in undertaking from 55.6 to 77.2 per cent; average percentage of dividend distributed from 4.8 to 5.2 per cent.

★

A preliminary agreement has been reached between the Ministry of Development on behalf of the Israel Government and the Israel Mining Industries Ltd. on one side, and the British company, Baker Perkins Ltd., of Peterborough, concerning the production, application, and marketing of T.B.E., a bromine compound, based on a new and non-expensive process invented and developed by Israel Mining Industries Ltd. Israel Mining Industries have developed two processes with regard to T.B.E.: a non-expensive method of production from end brine of the Dead Sea, and an ore dressing process based on the use of T.B.E., enabling the enrichment of relatively poor ores. Both processes have been patented in Israel and abroad, and are owned by that company. According to the agreement, a pilot plant with a maximum output of 250 tons per annum will be erected and operated not later than twelve months after the signing of the final contract. The foreign company will allocate $115,000 as an advance payment for future supply of T.B.E. Messrs. Baker Perkins Ltd. will undertake to design, build, develop, and sell special equipment for the ore dressing process of T.B.E. The projected pilot plant will be constructed in Sodom, in the Negev, on the site of the bromine works, at an approximate investment of I£250,000, which is about equal to £50,000 sterling. Simultaneously, the foreign company will erect abroad a demonstration unit capable of treating one ton of ore per hour. After an experimental period, a full-scale industrial plant with an annual minimum capacity of 5,000 tons of T.B.E. is envisaged in Sodom.

★

On Monday of this week, an underwater explosion unique in hydro construction blew a 30,000-ton rock plug at the Chute-des-Passes power project at Northern Quebec. Engineers at the Aluminum Company of Canada's 1,000,000 horse-power development detonated 60,000 lb. of explosives under a reservoir. The rock plug, measuring 100 ft. by 50 ft., was one-eighth of a mile under the Peribonca River, 600 ft. upstream from the Passe Dangereuse storage dam. This is the entrance to a six-mile long supply tunnel leading to the underground power house at Chute-des-Passes. It is located 150 miles north of the Saguenay district aluminium centre of Arvida. The 13,000 cu. yds. of rock shattered under the water dropped into a sump pit previously blasted out, 120 ft. deep and 55 ft. in diameter. Power from the Chute-des-Passes project will aid Alcan's power needs for its Saguenay district aluminium smelting operations and provide for additional smelter capacity. By early 1960, Alcan's total installed generating capacity in the Saguenay district will be 3,600,000 h.p.

PERSONAL

We regret to report the death, on April 14, 1959, of Dr. L. J. Spencer. He was 88. Dr. Spencer was Keeper of Minerals at the British Museum (National History) from 1927 to 1935.

★

Mr. R. Hadfield, a local director of Thos. W. Ward Ltd., Albion Works, Sheffield, was elected president of the Silica and Moulding Sands Association, at the annual general meeting on April 16. He has been vice-president for the past two years.

★

Mr. A. R. Putnam has been appointed managing director of the American Society of Metals.

★

Mr. R. Kimble has been appointed manager of the Operations and Maintenance Department of Fairchild Aerial Surveys Inc. The appointment includes the position of chief pilot.

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Mr. G. C. R. Eley has been appointed chairman of Richard Thomas and Baldwins in the place of Sir Ernest Lever, who has retired after nearly nineteen years as chairman.

★

Mr. Kojo Botsio, Minister for External Affairs for Ghana, is to become Minister for Economic Affairs, and will work in the Prime Minister's office.

★

Mr. W. K. Gregson has joined Short and Mason Ltd. as the northern area representative.

Mr. E. Patterson, M.I.B.E., M.S.I.A., has been created technical liaison officer of Wolf Electric Tools Ltd.

AGENCIES WANTED

Maschinenfabrik Rudolf Hausherr and Soehne, of Paul-Marien Strasse 1, Saarbruecken 3, have informed the British Consulate-General at Frankfurt am Main that they would like to get into touch with a United Kingdom manufacturer of mining equipment with a view to representation for the sale of products in the Saar. Ref. ESB/9096/59. Telephone inquiries to Chancery 4411, extension 776 or 866.

CONTRACTS AND TENDERS

Taiwan (Formosa)

Equipment for a coal mining project, including mine hoists, centrifugal pumps, ventilating exhaust fans, disc-type coal conveyors, portable conveyor units, rock drills and bits, engine lathe, grinding wheels and gauges. Issuing authority, Central Trust of China, Purchasing Department, 68 Yen Ping Nan Road, Taipei, Taiwan (Formosa). Closing date, May 4, 1958. Ref. ESB/8763/59/ICA. Telephone inquiries to Chancery 4411, extension 354.

India

Power-driven boring plant to maximum hole depth of 500 ft. Diesel power. Dia. of hole, 4 ft. to 10 ft. Bids to Director of Supplies and Disposals, Shahjahan Road, New Delhi. Closing date, May 7, 1959. Ref. ESB/9198/59. Telephone inquiries to Chancery 4411, extension 738 or 771.

Canada

Monorail hoist for generating station. Bids to Mr. D. M. Stephens, Chairman and General Manager, the Manitoba Hydro-Electric Board, P.O. Box 815, Winnipeg 1, Manitoba. Closing date, May 7, 1959. Ref. ESB/8917/59. Telephone inquiries to Chancery 4411, extension 738 or 771.

Portuguese East Africa

36,000 kg. copper ingots. Closing date, May 29, 1959. Issuing authority, Ports, Railways and Transport Department, Lourenco Marques. Ref. ESB/8928/59. Telephone inquiries to Chancery 4411, extension 738 or 771.

★

The Mechanical and Electrical Division of George Wimpey and Co. Ltd. have recently been awarded a contract worth nearly £200,000 for the complete coal-handling plant at Richborough power station, Kent, by the Central Electricity Generating Board. The plant has a capacity of 600 tons per hour.

★

The Argentine Government is inviting separate offers from interested firms with a view to the production of aluminium and other materials, all based as far as possible on materials available in Argentina. Proposals must be received by the Presidential Secretariat of Economic and Social Relations in Buenos Aires before April 30, 1959. Ref. ESB/8541/59. Telephone inquiries to Chancery 4411, extension 776 or 866.

★

An order for equipment spares for the Mogul Copper Mines in eastern Turkey has been received by Head Wrightson Stockton Forge, a subsidiary of Head Wrightson and Co., amounting to $125,000 (about £44,000).

Metals and Minerals

Brighter Prospects for the Volta Scheme

During the two years that have elapsed since Ghana became self-governing, Dr. Nkrumah has been vigorously exploring all possibilities of financing the Volta River hydro-electric project.

The original scheme for producing aluminium from locally mined bauxite using hydro-electric power generated by damming the Volta River was to have been a joint venture by the British and Ghana governments and two aluminium companies, Aluminium Ltd. and British Aluminium. In 1952, it was agreed to set up a Preparatory Commission to investigate the project, which as then envisaged provided for the construction of a generating station with a power potential of 617,000 kW., and for an integrated aluminium capacity of 210,000 tons of aluminium ingot per year. The Commission's report was published three and a half years later, but by that time the estimated cost had increased from £144,000,000 to £231,000,000. The British Government and the two aluminium companies then deferred their final decision, Aluminium Ltd. stating that it was not in a position to proceed immediately with the project, and would not stand in the way of other interested parties.

The Ghana Government has since been examining the position in consultation with the United States Government, and has been searching for other partners. Following Dr. Nkrumah's visit to the United States last year, an agreement was signed with the Henry J. Kaiser Co. for a new survey jointly sponsored by the United States and Ghana governments, in order to reassess the cost. A few weeks later, a two-day aerial survey of the entire hydro-electric aspect of the project was carried out by executives of the Kaiser Industries Corp. and officials of the Ghana Development Commission.

Kaiser's report was submitted to the Ghana Government at the end of February this year, and has considerably improved the outlook for the Volta scheme. The corporation recommends that the main dam site at Ajena should be moved a mile away to Kosombo, where the capacity would be 768 mW., the cost of the dam and generating plant being estimated at £55,700,000. The report also advocates the building of two extra dams at the Kpong rapids and Bui, together with power plants to cost an estimated £41,000,000, and a power transmission network to serve Accra, Kumasi, and Takoradi, for an estimated £12,000,000 (estimates of cost are based on prices ruling in January, 1959).

Kaiser also estimates that the project could be completed in five and a half years, as compared with the seven years indicated by the Preparatory Commission, and that the cost of power to aluminium users would be cheaper than had been predicted, ranging at the initial stage from 0.38d./kWh. to 0.22d./kWh., and at the final stage from 0.2d./kWh. to 0.17d./kWh.

Dr. Nkrumah has signed an agreement for preliminary work on the project, which will include foundation exploration, determining the basic design of the dams and power plants, and building roads to the dam sites.

In view of the favourable nature of the report, Ghana has requested the United States Government to continue its efforts to interest aluminium companies in using power from the Volta and, in addition, to seek to interest other possible large users of hydro-electric power.

U.S. MERCURY SQUEEZE?

Mercury continues to be quoted at £79 in the United Kingdom, but in the United States a further substantial rise in price has taken place, the quotation for domestic f.o.b. New York being currently $240 to $250 per flask, compared with $237 to $240 a week ago, and it is reported that some supplies for spot delivery are selling as high as $250.

The squeeze which is apparently developing in the United States is attributed to wrong assumptions made by dealers early in the year, when it was generally considered that the suspension of purchases for the United States stockpile would result in the diversion of considerable quantities of Mexican metal to Europe, thereby depressing the market. On this assumption, quicksilver was being sold in January for as little as £71 or £72 a flask, compared with the quoted price of £74, and it is believed that three months' forward sales at very moderate prices were also made.

Two factors which have upset dealers' calculations are, in the first place, a shortfall in Mexican production which, for technical reasons, has been below expectations; and secondly, the suspension of production by United States domestic producers (who relied mainly on government purchases) when the stockpile closed, with the result that non-government customers had to turn to Mexico for supplies. Mexican metal, far from becoming freely available in Europe, is consequently scarce.

Though supplies of mercury are reported to be on their way to the United Kingdom from Mexico and South America, it is believed that these have been sold forward, so that their arrival may not do very much to lessen the shortage of on-the-spot metal in London.

DECLINE IN COBALT OUTPUT

World production of cobalt decreased for the second successive year to about 14,000 s.tons in 1958, according to the Bureau of Mines, United States Department of the Interior. Production was 10 per cent less than in 1957. Output of cobalt by Canada and Belgian Congo decreased sharply (to 1,610 and 7,179 s.tons respectively), but these losses were partially offset by increases in Northern Rhodesia (1,677) and the United States (2,009).

Consumption of cobalt in the United States declined to 3,737 s.tons, being 18 per cent less than in 1957 and 20 per cent below the average for the five years 1953-57. The decline resulted chiefly from a 20 per cent drop in usage of cobalt in permanent magnets and high-temperature alloys, the two major uses. Less cobalt was also consumed in high-speed and low-cobalt alloy steels, alloy hard-facing rods, cemented carbides, and ground-coat frit for porcelain enamels. The only increases for the year were a 17 per cent rise in pigments and minor improvements in salts and driers and miscellaneous uses.

United States imports decreased to 8,243 s.tons (cobalt content), a loss of 6 per cent from 1957.

FALL IN WOLFRAM STOCKS

The recent demand for wolfram ore from the U.S. has injected an underlying steadiness into the European market, which otherwise it would have lacked. Available stocks of ore in Europe have been considerably reduced as a result of these purchases, which are now estimated to have involved up to 300 tons and possibly even more. Demand for marginal supplies in Europe has remained small, since several countries are evidently getting sufficient material under contract. A considerable part of West German and Austrian requirements, for instance, is being supplied by the U.S.S.R.

CHROME IN THE DOLDRUMS

Demand for chrome ore remains at a low ebb and prospects for any worthwhile pick-up in buying interest are still regarded as rather bleak. Generally speaking, buyers are covering their immediate interests only, current demand being for small lots, with Japan continuing to show some interest.

Despite the lack of demand there has been no great pressure to sell on the part of some producers, but in the case of Turkish ore, prices have further eased.

Last year Turkey exported 509,092 tonnes of chrome ore, of which 340,709 tonnes were shipped to the U.S., 34,942 tonnes to France, 30,139 tonnes to West Germany, and 22,759 tonnes to Britain.

Due to disagreement on certain details, the bartered deal involving some 50,000 tons of Transvaal chemical grade ore in exchange for U.S. wheat has not yet been finalized.

MOLYBDENUM AND VANADIUM IN THE U.S.

United States production of molybdenum contained in concentrate during 1958 was the lowest in any year since 1951, and consumption was the least since 1954, reports the Bureau of Mines, U.S. Department of the Interior. In terms of contained molybdenum, production of concentrates totalled 20,543 s.tons and consumption 15,650 s.tons. Stocks of molybdenum products at producers' and consumers' plants increased during 1958 by 40 and 39 per cent respectively.

Molybdenum consumed in the production of ferrous alloys (including welding rods and corrosion and heat resisting alloys) decreased 25 per cent compared

with the previous year, but its use as metal increased 115 per cent and its use in making lubricants and colour compounds increased 17 and 11 per cent respectively.

Consumption of vanadium in the United States was about 30 per cent less in 1958 than in 1957, the year's total amounting to 1,259 s.tons. On December 31, 1958, stocks at consumers' plants totalled 276 s.tons.

Production of vanadium pentoxide is estimated to have decreased to approximately 5,682 s.tons (gross weight) containing 5,000 s.tons of V_2O_5 in 1958 compared with 7,216 s.tons containing 6,443 s.tons of V_2O_5 in 1957. Vanadium pentoxide from domestic ores was produced at five plants in 1958. There were no imports of vanadium ore or concentrate or other forms of vanadium in 1958 through to November, but in December a small consignment of vanadium compounds was imported from Switzerland.

Ferrovanadium is produced in the United States by two companies. The Bureau of Mines is not at liberty to publish the output figures, but production in 1958 was approximately 55 per cent less than in 1957.

It is significant that consumption of vanadium in the United States was 19 per cent greater in December than in November.

BERYLLIUM'S BRITTLENESS OVERCOME

Beryllium has a number of desirable attributes, such as stiffness, light weight, heat resistance, and low weight-to-fuel ratio for rocket and space vehicles, but its development as an engineering metal has been hampered by brittleness, with consequent difficulties in fabrication. However, it has been reported from America that beryllium produced by the Beryllium Corporation has been fabricated into a large closed-die forging by Wyman-Gordon at its United States Air Force plant in Massachusetts. Now that the problem of brittleness has been overcome, beryllium's prospects as a potential material for structural engineering in the aeronautical and missile fields would appear to have considerably improved.

AND NOW SCANDIUM

Scandium is reported to be under research and development in the United States as a material for aircraft construction. Standing next to titanium in the periodic table of elements, and just underneath aluminium, it shows similarities to both, and is about midway between them in both melting point and density. Hitherto, it has been almost completely neglected.

COPPER · TIN · LEAD · ZINC

(From Our London Metal Exchange Correspondent)

Price movements in all markets have tended in an upward direction, and the copper market in particular has developed an increasingly strong undertone following the cessation of the heavy selling which dominated last week except for Friday.

COPPER STOCKPILE CASTS ITS SHADOW

After the sharp fall in prices noted during the first half of last week, a sudden collapse took place on Thursday subsequent to it being rumoured that the U.S. Government was contemplating releasing copper held by the office of Civil and Defence Mobilization. Heavy selling also continued. On Friday the tone of the market was better, as selling was on a much smaller scale and reports were available of action in the U.S. Senate condemning any copper release. Subsequently, this was followed by a statement that if copper was released it would not be at a rate of more than 5,000 tons a month and that this would only take place if it could be done without disturbing the market. The original rumour spoke of 128,000 tons, so that any project would be of a very long-term nature. At the time of writing, there has still been no definite denial that a release is going to take place, but everything points to the fact that it is unlikely to happen in view of the effect the rumour had upon prices.

In conformity with the downward trend, the Belgian price at the end of last week was reduced by the equivalent of almost 1 c. per lb. to the equivalent of 30 c. per lb. New York or Antwerp. The custom smelters in the U.S. reduced their buying price for No. 2 Scrap to 25¼ c. per lb. but, with the return of confidence, this was raised on two successive occasions to 26¼ c. per lb. when the custom smelters' price for copper was raised on Tuesday to 32½ c. per lb.

This last action indicates that there is still an avid demand for the metal in America and with the primary producers indicating that they have not much free metal available, there is every expectation that a strong copper market will be seen in the immediate future. Most observers feel, however, that the price is unlikely to regain the heights of a month ago.

Business on the Exchange has been quieter and the contango appears to be more firmly established with a further rise in the stocks in official warehouses of 400 tons to a total of 10,141 tons. As was to be expected, the violent movement in the price of metal has caused European consumers to keep away from the market. It will probably be some days before this position is rectified although in the U.S. offtake has continued to be satisfactory.

BUFFER STOCK BELIEVED CONTRACTING WITH U.S.

Once again, the tin market has been featureless and price movements over the week have been narrow. As stocks in official warehouses again decreased by 421 tons to 9,205 tons, it is now considered that it is almost certain the buffer stock manager has entered into some fairly sizeable contracts with U.S. consumers, and it will be interesting to see whether any reference is made to this effect after the next meeting of the Tin Council towards the end of May. On Thursday the Eastern price was equivalent to £810¼ per ton c.i.f. Europe.

U.S. LEAD PRICE UP

The surprise of the week occurred in the lead market when the U.S. price was raised by ½ c. to 11½ c. per lb. and although this caused a brief flurry in London, it is doubtful whether the sterling price will obtain any benefit from the action. Some people see in this the first results in America of the quota system and, should they prove to be correct, the disparity between the sterling and dollar quotations should now begin to widen. On the other hand, the president of American Smelting and Refining Co. announced that the output for the Buchans mine in Newfoundland would be cut by 10 per cent as from the middle of this year, and also that it was estimated that the output of Mount Isa would also be cut from the same date to give an annual production of about 53,000 tons instead of the 60,000 tons expected to be produced in the year 1958/59.

The zinc market continues on its unspectacular course with the maintenance of a nominal backwardation and very little interest being shown.

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During the week the British Bureau of Non-Ferrous Metals' statistics published, all in long tons, their figures for the U.K. for February and these showed that the consumption of copper totalled 48,293 tons against 52,979 tons in January. Stocks of refined copper at the end of the month showed an increase at 65,875 against 60,798. During the month it is noted that the U.S.S.R. continued to take sizeable tonnages and China once more appeared as a destination to which metal was sent. Consumption of refined tin totalled 1,614 against 1,769 but stocks showed a decrease at 14,715 as compared with 15,744 a month earlier. Offtake of lead was 25,968 as compared with 28,872 but stocks fell to 43,542 against 48,102. Consumption of zinc was 25,676 against 27,489 with stocks showing a small rise at 36,850 compared with 34,805.

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Statistics issued during the past week show that during 1958 Northern Rhodesia produced 133,423 s.tons of blister copper and 241,526 s.tons of electrolytic copper against 169,531 s.tons and 246,680 s.tons respectively for the previous year. Production of zinc remained almost unaltered at 30,250 s.tons whilst that of lead showed a decline of about 2,000 s.tons at 13,043 s.tons.

Closing prices were as follows:

	April 16		April 23	
	Buyers	*Sellers*	*Buyers*	*Sellers*
COPPER				
Cash	£229½	£229¾	£235½	£236
Three months ..	£229¾	£230	£236½	£236¾
Settlement ..	£229¾		£236	
Week's turnover	18,725 tons		10,250 tons	
LEAD				
Current ½ month	£67½	£68	£70½	£70¾
Three months ..	£69½	£69¾	£71¼	£72
Week's turnover	7,375 tons		7,650 tons	
TIN				
Cash	£781	£782	£782	£783
Three months ..	£782	£783	£783	£783½
Settlement ..	£782		£783	
Week's turnover	210 tons		920 tons	
ZINC				
Current ½ month	£71¼	£71¾	£73½	£74
Three months ..	£71¾	£71½	£73½	£73¾
Week's turnover	8,350 tons		4,600 tons	

London Metal and Ore Prices appear on inside back cover.

Mining Finance

A Major Decision for R.B.H.

There are two major points in the Rhodesia Broken Hill report for 1958. The first is that the life is now officially put at about 25 years which finally kills the doubts in this respect that have hovered intermittently over the shares in recent years. The second is that the management is exploring the possibility of using the new Imperial Smelting process for treatment of the mine's complex lead and zinc ores.

The life statement is a decided bull point for the 5s. stock units. The possibility that it may be decided to go ahead with new treatment plant might be construed as something of a short-term bear point in that it will involve "very substantial" capital expenditure. If the decision is taken to proceed with the project then it "will have to be followed up by consideration of the best means of providing the substantial amount which will be required".

On the long term, of course, the new plant should be very much to the company's advantage, because R.B.H. has been having trouble with its ore treatment. For instance, a year ago problems connected with sintering (plus, of course, the low metal prices) so reduced the profit margin from the new lead blast furnace that it was reluctantly decided to revert to the old Newman hearth plant and to accept a lower level of production in order to reduce costs.

Even if the new process is introduced Mr. Harry Oppenheimer, the chairman, points out that it is proposed to continue to produce electrolytic zinc from zinc concentrates in the existing plant, to which a second roaster is to be added by next year to enable a greater amount of concentrates to be treated.

As regards the market for lead and zinc, Mr. Oppenheimer finds it difficult to make any prediction about prices in 1959. Some governmental decision, he says, may be taken to cut production and there has been an improvement in the business tempo of the United States, but "it does seem that world production of both metals will be fully able to meet expected consumption this year". R.B.H. is fortunate that the bulk of its output is sold in Southern Africa and no difficulty is expected in disposing of stocks and current production during 1959.

There may be some recovery in profits as a result of the improvement in the zinc price which is now around £73 against the 1958 average of £66 a ton. On the other hand, lead is only about £70 against the average last year of £73. There is also the point that capital expenditure in 1959 is expected to be £300,000, of which £100,000 has been appropriated in the current accounts.

It would, therefore, not be advisable to look for a better dividend than last year's reduced payment of 24 per cent which yields 9.1 per cent at 8s. 3d. R.B.H. must now rank quite highly among lead-zinc issues.

LONDON MARKET HIGHLIGHTS

Interest ebbed away in South African gold shares during the past week. Even the appearance of the last of the March quarterly reports failed to stimulate much business. Hartebeest, which had previously given ground on fears of a poor quarterly report, hardened to just over 40s. when the news from the mine proved reassuring, particularly in regard to the new deep-level area. Stilfontein continued to drift back for a while on its disappointing quarterly, but after sinking to 39s., a recovery in the shares to 40s. 3d. was helped by some bear closing.

Vaal Reefs (39s. 9d.) held up well and Johannesburg was an occasional buyer of Loraine which touched 29s. 6d. at one time. A reasonable turnover persisted in Free State Geduld and Western Holdings, but both prices were little changed on balance.

Elsewhere, the sharp setback in March quarter's profits at Consolidated Murchison caused the shares to weaken 3s. 9d. to 43s. 9d. Diamonds showed little movement for much of the time, but around mid-week attention was drawn to the high yield offered by "Casts" and they jumped 1s. to 17s. 10½d.

There was not a great deal more interest in the base-metal sections of the market, but the undertone was firm enough. The news that Broken Hill South had discovered important new ore deposits made a dramatic impact on the share market. As recently as a month ago, the mine had announced further dismissals of workers because of dwindling ore supplies. Consequently, the sudden announcement of what appeared to be a new lease of life for Broken Hill South touched off a rise of 8s. 6d. in the shares to 55s. 6d. Only 1s. was lost during the inevitable profit-taking that followed.

Copper shares continued to idle along, but perked up when the metal price climbed to above £238 a ton. Chartered (85s. 3d.) were additionally helped by the appearance of a jobber's brochure outlining the undoubted investment merits of the shares. The Rhodesia-Katanga report was received with some mixed feelings. News of prospecting activity on some of the company's concession areas did no harm, but what everybody had been waiting for was some clue about the future of the associated Kansanshi copper mine. Telling of the erection of a pilot plant to treat the property's complex ore, the report indicated that no decision was likely on the reopening of the mine before the end of this year. The shares eased back to 15s., but buyers, scenting the possibilities of "Rho-Kats" as a long-term speculation, soon reappeared.

Rio Tinto moved up to 51s. 10½d. Demand for uranium will continue to be largely governed by military needs, so that the week's new evidence of oversupply was not taken as a bear point.

Tin shares held as steady as ever. Potential buyers found that little stock was available, particularly in Sungei Kinta, which advanced 2s. to 16s. on a relatively modest demand.

NEW LIFE FOR BROKEN HILL SOUTH

A statement from the Broken Hill South directors about the life of the property had quite a startling effect on the share market, considering that the earnings prospects for the year to June 30 next are hardly likely to be sensational. The initial rise of 8s. 6d. to 55s. 6d. in the 5s. stock units was probably largely due to sheer surprise, it having been announced in March that employees were being laid off owing to the "shrinkage of the mine". Now prospecting results are indicating that the life of the mine may not be limited to the tonnage in the main lode between the northern and southern boundaries, as had been "assumed for some years". Diamond drilling has indicated new oreshoots quite distinct from the main lode orebodies worked in the past. Additionally, it is now stated to be clear that within the main lode itself there is ore available "appreciably in excess" of the published reserve figures.

Outside the mine leases, three locations of potential interest have been disclosed. Of these, the two largest are considered to be of such an extent that it is desirable "to seek partners" for their development. The third will be prospected by the company itself. Broken Hill South units, in fact, seem likely to move on to a new price basis that will no longer give an above average yield owing to doubts about the company's life prospects.

Another important point made in the official circular is that the mining losses incurred last year have been eliminated and that the mine operated at a "modest surplus" for the first half of the current financial year. In 1957-58, there was a loss of £72,000 on mining operations, but this was turned into a modest surplus of £238,000 by the realization of £310,000 from sale of metals produced in 1956-7.

The first concrete evidence of how things are going will come with this month's interim. In the meantime, "with the changed outlook at the mine," the 5s. stock units are to be split into 1s. denomination as from May 1. This is likely to make them a popular low-priced lead-zinc counter. For 1957-58, Broken Hill South paid an interim of 1s. 6d. followed by a final of 2s. All the figures mentioned, including the share denomination, are in Australian currency.

WESTERN SELECTION PAY AGAIN

The utilization of the whole of the £501,728 share premium account to write down the value of investments, sanctioned by the Court last October, has had the promised result for Western Selection and Development—a return to the dividend list.

This mining finance house which now has widespread interests in Canada as well as in its original Ghana gold and Nigerian tin producers is to pay 4½d. per 5s. stock unit for the year to September 30 last, the first distribution since the 6d. on account of 1954-55. In 1956-57 the company earned enough to make a payment, but did not do so because the investment portfolio showed a market depreciation of £375,602. By now this will have been wiped out.

For 1957-58 the company did better on all counts. Dividend revenue rose by £15,769 to £71,337, profit on realization of investments by £14,590 to £23,896 and other revenue by £8,897 to £22,110. As a result the net surplus is up by £34,957 to £95,128. This covers the

(*Continued on page* 452)

AMALGAMATED COLLIERIES OF SOUTH AFRICA, LIMITED

(Incorporated in the Union of South Africa)

INCREASED REVENUE

The following extracts are from the statement by the Chairman, **Mr. T. Coulter,** which has been circulated with the annual report and accounts for 1958 :—

Accounts

Comparative figures for 1957 are given in brackets. The gross profit on coal mining was £616,055 (£612,535). Dividends received amounted to £345,505 (£312,065), while income from trade investments, interest, rents, and sundry revenue came to £43,088 (£39,104). Total revenue was thus £1,004,648 (£963,704).

After deducting administration expenses at £40,488 (£40,065) and making provision for taxation at £158,500 (£159,500) and adding unappropriated profit brought forward after adjustment of £281,569, the sum to be dealt with was £1,087,229 (£1,063,897).

As a result of additional profits from the company's directly operated Cornelia Colliery and increased dividends from the company's subsidiary, Springfield Collieries Limited, it was possible to increase dividend payments by 3d. per share to 4s. 3d. A further £100,000 was transferred to reserve against capital projects at Cornelia and Schoongezicht and £8,586 was appropriated for capital expenditure incurred during the year. At the same time the carry forward was increased slightly from £285,067 to £317,768.

Current assets, excluding stores, at £1,301,183, showed a surplus of £331,882 over current liabilities, including provision for taxation.

The company directly operates three collieries, Cornelia at Vereeniging, Schoongezicht in the Middelburg district, while Springfield, near Balfour, is owned by a subsidiary, Springfield Collieries Limited, in which your company owns virtually the entire issued capital.

Directly Operated Collieries

CORNELIA COLLIERY: The colliery achieved a record sales output during 1958 of 3,849,190 tons from its three shafts, an increase of 219,618 tons over the previous year. This resulted in a gross mining profit of £455,393 compared with £438,875 in 1957.

Sales for the year were distributed as follows. For comparative purposes the figures for 1956 and 1957 are also given:

	Tons 1958	*Tons* 1957	*Tons* 1956
Power station trade	2,660,073	2,529,562	2,348,445
T.C.O.A. trade	879,712	783,665	821,587
Local trade	309,405	316,345	304,783
Totals	3,849,190	3,629,572	3,474,815

As in former years, due to difficult mining conditions underground associated with the dolomite strata which underlies the coal measures, extensive surface drilling was necessary to assist in the planning and development of the mine. Work was started on a new shaft to provide additional ventilation and a travelling way for certain of the more remote areas mined from the Betty Shaft. Mining has taken place in the Betty Shaft field for approximately 60 years and working faces are now a considerable distance from the shaft itself. The new shaft will be completed shortly and will materially improve mining conditions.

At the two Bertha Shafts, mining operations continued normally though bad roof conditions caused difficulty in certain areas. All three coal seams are mined from these shafts in varying proportions and, as at the Betty Shaft, where only the middle and bottom seams are mined, great care and attention has to be paid by management to planning superimposed pillars, haulages and workings.

SCHOONGEZICHT COLLIERY: This colliery improved its sales output by 145,564 tons compared with 1957 to a record of 908,161 tons. Following the firedamp explosion which took place in 1956, a large capacity upcast ventilation shaft was sunk which now ensures the rapid evacuation of any accumulations of gas.

Profit for the year amounted to £160,662 compared with £173,660 in the previous year. The lower profit, despite a higher sales output, is accounted for by the fact that profits in 1957 were inflated by insurance payments following the underground explosion and virtually represented the results of fifteen months operations.

Subsidiary Companies

SPRINGFIELD COLLIERIES LIMITED: The company had a satisfactory year and sales at 2,082,221 tons were 66,631 tons higher than the figure for the previous year. Of the company's total sales, 99 per cent, or 2,059,377 tons, were despatched to the Klip Power Station of the Electricity Supply Commission. Net profits for the year after taxation were £233,850 compared with £221,169 in 1957.

BLESBOK COLLIERY LIMITED: This company's output is now reserved entirely for the South African Iron and Steel Industrial Corporation, Limited, for which organization a blend coking coal is produced. Total sales at 612,665 tons were 9,784 tons lower than in 1957.

Profits earned after tax amounted to £117,145, compared with £139,166, and dividend payments at 9d. per share were 1d. lower.

NEW LARGO COLLIERY LIMITED: The company has two pits established and equipped to supply the demands of the Wilge Power Station. The company also supplies the requirements of the Electricity Supply Commission's Rand Power Stations.

At the present time the demands of Escom necessitate carrying on of mining operations at "A" Winning only and the second pit will continue to remain idle until demand increases.

Sales for the year ended June 30, 1958, amounted to 1,272,601 tons compared with 1,286,082 tons for the previous year. Net profits after taxation at £164,845 showed an increase of £15,696 as compared with the previous year and dividends were increased from 9d. to 10d. per share.

WITBANK COAL HOLDINGS LIMITED: The net profit after taxation was £21,143 compared with £19,914 in 1957. Dividends paid amounted to 2s. 3d. per share.

General

Towards the end of the year a welcome improvement in the supply of trucks for coal hauling purposes became apparent.

The total Union output for 1958 was 39,940,276 tons, which is an improvement of 2,253,748 tons on the previous year's figure.

After prolonged negotiations an increase of 1s. 3d. per ton for Transvaal coal was granted with effect from November 1, 1958. By that time substantial portions of the increase had already been absorbed by rising costs.

MINING FINANCE—*Continued*

dividend payment, which requires £45,938 net, more than twice. Nothing is required for writing down investments against £87,373 a year ago.

The full report is promised considerably earlier than last year with the meeting scheduled for next month. Of particular interest will be the very full exposition that is usually given of the progress of Western Selection's various embryo Canadian ventures which are controlled in that country by Anglo Barrington Mines. It is on results in Canada that chances of material capital appreciation in Western Selection stock units mainly depend.

RHO-KATS PAUSE

The Rhodesia-Katanga report proved a disappointment to the share market in so far as it seemed to imply that any major decision about the future of the Kansanshi copper proposition in Northern Rhodesia is unlikely to be taken much before the end of the year. The position is that laboratory research has indicated that there can be 90 per cent recovery of copper from Kansanshi's rather difficult ores. The next stage is a pilot plant to give practical proof of this, and such a plant is to come into operation by the middle of this year. Its work of testing, however, is not expected to be complete before the end of the year. Only then will the management be able to come to grips with estimates of how much it will cost to erect a major treatment plant and to dewater the mine, which was partially flooded in October, 1957, and which has since been on a care-and-maintenance basis.

Mr. C. J. Holland-Martin, the chairman of Rhodesia-Katanga, which has a 35 per cent interest in Kansanshi (the other major holder in Anglo American Corporation and associates, 41 per cent), says that the site is remote from railhead and sources of power, but, and here is a really important point, this particular mine is free from the royalty payments that other Northern Rhodesian copper producers have to pay to the British South Africa Company. The bringing of Kansanshi to production is obviously going to be a long haul and will necessitate the raising of considerable further sums of money. The main hope of holders of "Rho-Kats" £1 Ordinary is that any favourable decision to exploit Kansanshi will lead to a wave of speculation in these fast-moving shares, now 15s. 3d. against over 55s. in 1957.

ZANDPAN GOLD MINING COMPANY LIMITED

(Incorporated in the Union of South Africa)

FINANCING MINE'S DEVELOPMENT

MR. B. L. BERNSTEIN ON INITIAL PROGRAMME

The 4th annual general meeting of Zandpan Gold Mining Company Limited will be held on May 18 in Johannesburg.

The following is the circulated review of the chairman, **Mr. B. L. Bernstein**:—

The offer of shares made at the end of last year provided your company with funds amounting to £2,600,000. This amount, together with the further issue of four million shares to be made in November, 1960, at 12s. 6d. per share and the loan facilities of £2,000,000 which have been arranged, will result in your company having at its disposal a total of £7,100,000. This sum should be sufficient to complete the first phase of opening up the Zandpan mine, which consists of the completion of No. 1 shaft system, the provision of the necessary services and facilities, and the carrying out of a certain amount of underground development.

Work on the property commenced in October, 1958. The collar of No. 1 shaft has been completed and the shaft was sunk to a depth of 198 feet below surface. Sinking has been stopped temporarily while the permanent concrete headgear is being cast and equipped, and surface installations completed. It is hoped to commence full-scale shaft sinking by June, 1959.

No. 1 shaft, which is circular and 26 feet in diameter, will be provided with a brattice wall to give both upcast and downcast ventilation. It was intended that this shaft would be sunk from surface to a depth of approximately 5,000 feet and that a sub-vertical shaft would then be sunk to a final depth of approximately 7,500 feet below surface. In order to enable exploratory development to be commenced at an earlier date than would otherwise have been the case, we now intend to sink the surface shaft to the reef horizon, which is estimated to be about 7,000 feet from surface.

When the initial programme has been completed it will be necessary to raise further capital in order to sink a second shaft from surface, to construct a reduction plant and to provide the housing, services and facilities required to bring the mine to initial production.

At present, in the interests of speed and economy, arrangements have been made for operations at the mine to be under the control of the manager of the Hartebeestfontein Mine. I desire to place on record your board's appreciation of the services that have been rendered by the management and staff of the Hartebeestfontein Mine, and by the staffs at both the head office and the London office of the company.

Company News

As from April 8, 1959, the new telephone number of British Insulated Callender's Cables Ltd., Bournemouth depot, will be Bournemouth 36223.

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The Pyrene Co. Ltd. announces that it has formed a new wholly owned subsidiary company, Pyrene-Panorama Ltd. The new company will take over as a going concern from Panorama Equipment Ltd., Panorama Equipment (Export) Ltd., and Industrial Protection Ltd., the business, including the trade-mark Panorama, of manufacturing and selling safety equipment previously conducted by those companies under the trademarks Panorama and Panoramette.

★

Black and Decker Mfg. Co., Maryland, United States, parent company of Black and Decker Ltd., announce that they are taking over the operation of the Master Pneumatic Tool Co., Ohio, in the name of Master Power Corporation. Master Power Corporation becomes a wholly owned Black and Decker subsidiary from April 10, 1959.

★

The Electric Motor Division of Newman Industries Ltd. has opened an additional area office at 59 Grey Street, Newcastle upon Tyne 1. The telephone number is Newcastle 2-3970.

★

Frederick Parker Ltd. have formed a new Canadian company, Frederick Parker (Canada) Ltd., to look after the company's Canadian interests. The headquarters will be a new block of offices in the Scarborough district of Toronto.

★

I.C.I. is to extend its polyolefine activities with the introduction of a new polypropylene plastic under the trade name "Propathene". An agreement has been signed whereby I.C.I. acquires a licence under the Montecatini and Montecatini/Ziegler U.K. patents covering the production and use of this new plastic material, originally discovered by Professor Natta. A new plant to manufacture "Propathene" is being constructed at Wilton Works in North Yorkshire. It will bring I.C.I.'s total polyolefines capacity for Alkathene and Propathene to over 100,000 tons a year. Propathene is at present being manufactured at a pilot plant, and arrangements have been made to augment this pilot plant production so that the material will be available in substantial commercial quantities from June 1.

★

Johnson, Matthey and Co., Ltd., have acquired an interest in the important Italian precious metal refining and manufacturing company Metalli Preziosi S.p.A. of Milan. This old-established company, with a history of over one hundred years of association with precious metals, is by far the largest enterprise of its kind in Italy. Johnson, Matthey have already been working in close collaboration with Metalli Preziosi for a number of years, and some ten years ago they entered into arrangements with this company with regard to their general representation in Italy.

★

From April 1, the trading activities of The Alton Battery Co., Ltd., have been taken over by Pritchett and Gold and E.P.S. Co., Ltd., who have been manufacturing on behalf of The Alton Battery Co. since early 1958.

Fifty Years of British Petroleum

Founded half a century ago to operate the newly-discovered oil resources of Iran, The British Petroleum Co. Ltd., celebrated 50 years of existence on April 14, 1959. To commemorate the company's first half-century a dinner was held on the fiftieth birthday at Claridge's Hotel, where the guests included the Rt. Hon. Derick Heathcoat Amory, M.P., and Lord Birkett, with Sir Neville Glass, chairman of the company.

Other activities to mark the half century of achievement include publication of a history of the company entitled *Adventure in Oil: The Story of British Petroleum*, as well as the production of a pictorial history named *B.P., Fifty Years in Pictures.*

It was on May 28, 1901, that William Knox D'Arcy was granted an oil concession by the Persian Government. That was the beginning of the company's growth, through two world wars and into international ramifications. By the end of 1959, when the Grangemouth refinery expansion is completed, the capacity of British Petroleum in the U.K. alone will total 13,500,000 tons a year.

The company has developed a ship's bunkering organization covering 190 ports, while equally impressive progress has been made in its aviation service.

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